UNCLASSIFIED

AD NUMBER AD861694 NEW LIMITATION CHANGE TO Approved for public release, distribution unlimited **FROM** Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; OCT 1969. Other requests shall be referred to Department of the Army, Fort Detrick, Attn: Technical Release Branch/TIO, Frederick, MD 21701. **AUTHORITY** BDRL ltr, 29 Sep 1971

TECHNICAL MANUSCRIPT 548

ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PHAGE 71

D 86169

Ivan D. Goldberg Theodore Bryan

OCTOBER 1969

Reproduced by the CLEARINGHOUSE for Federal Scientific & Technical Information Springfield Va. 22151



Fort Detrick
Frederick, Maryland

DEPARTMENT OF THE ARMY Fort Detrick Frederick, Maryland 21701

TECHNICAL MANUSCRIPT 548

ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION
OF STAPHYLOCOCCUS AUREUS TYPING PHAGE 71

Ivan D. Goldberg

Theodore Bryan

STATEMENT #2 UNCLASSIFIED

This document is subject to special export controls and each transmittal to foreign governments or foreign nationals may be made only with p-ior approval of Dept. of Army, Fort Detrick, ATTN: Technical Release Branch/TID, Frederick, Maryland 21701

Medical Bacteriology Division BIOLOGICAL SCIENCES LABORATORIES

Project 1B061102B71A

October 1969

ACKNOWLEDGMENTS

We thank the National Communicable Disease Center, Atlanta, Georgia, for the typing phages and indicator strains. Isolate 6N-15 of Staphylococcus aureus 100 was obtained from M.E. Friedman, Fort Detrick, who also provided many helpful discussions.

ABSTRACT

Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10^{-9} on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10^{-10} on 71.

ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PHAGE 71*

During attempts to find a phage with a high efficiency of plating (EOP) on Staphylococcus aureus 6N-15, a derivative of S. aureus 100, we tested 35 staphylococcal typing phages. None plated on 6N-15 with an EOP higher than 10^{-3} . This report is concerned with a reciprocal host-controlled modification of one of the typing phages, 71, that resulted in a 10^{8} - to 10^{9} -fold increase in plating efficiency on 6N-15.

Phages were usually propagated at 37 C in shaken flasks of trypticase soy (TS) broth (BBL) supplemented with 400 μg CaCl₂ per ml.² Flasks were inoculated with a 10% transfer of a 16-hour culture. Cells were infected at a multiplicity of 0.5 to 1.0 and incubation was usually continued until lysis. Phage 71.6N-15 could also be propagated on TS broth agar + 400 μg CaCl₂ per ml (bottom layer 1.5% agar, top layer 0.5% agar).

Phages were assayed by the agar layer technique.³ For phage 71.6N-15, the bottom layer (25 ml) contained 30 g of TS broth + 400 µg CaCl₂ per ml and 15 g of agar (Difco) per liter; the top layer (3 ml) contained 30 g of TS broth + 400 µg CaCl₂ per ml and 5 g of agar per liter. Phages 71.71 and 71.6N-15.71 could be assayed on the same medium, but more discrete plaques were obtained when the top layer contained 37 g of brain heart infusion broth (Difco) instead of the TS broth. Indicator cells (5 x 10⁷ per plate) were grown in a modified version of the medium of Chu et al.^{1, ***} consisting of 4% N-Z-Amine, type NAK (Sheffield), 0.2% yeast extract (Difco), and 0.2% glucose, pH 6.7. Usually, freshly grown 6-hour cells were used, although the cultures could be stored at 4 C for 3 days without appreciable change in plating efficiency.

Table 1 shows the plating efficiencies of restricted and modified phage 71. Phage 71 that had been propagated on S. aureus 71 plaqued at an extremely low efficiency on S. aureus 6N-15. However, progeny phages (71.6N-15) from a plaque that appeared on 6N-15 following plating of phage 71.71 were found to have undergone reciprocal host-controlled modification. The isolated phage was purified by several single-plaque isolations on 6N-15. Phage 71.6N-15 plaqued with a high efficiency on 6N-15 but its relative efficiency on 71 was only 5 x 10-9. That this alteration was probably host-controlled and not the result of a mutation can be seen from the results shown in the third line of Table 1. Phage 71.6N-15.71 was isolated from a plaque that appeared on strain 71 after plating 71.6N-15. The EOP of phage 71.6N-15.71 was similar to that of 71.71 on strain 71. The data shown in Table 1 also reveal that the modification altered the EOP on S. aureus strain 55. All three restricted and modified phages adsorbed >99% to strains 71 and 6N-15, indicating that the changes in EOP were not the result of tail alterations.

^{*} This report should not be used as a literature citation in material to be published in the open literature. Readers interested in referencing the information contained herein should contact the senior author to ascertain when and where it may appear in citable form.

** M.E. Friedman, personal communication.

TABLE 1. ASSAY OF PHAGES 71.71, 71.6N-15, AND 71.6N-15.71 ON STRAINS OF <u>S. AUREUS</u>

	Plaque-Forming	Units/ml on In	dicator Bacteria
Phage	71	6N-15	55
71-71	4.5×10^{10}	2.5×10^2	3.2×10^{10}
71.6N-15	6 x 10 ⁰	1.2×10^{10}	<10 ³
71.6N-12.71	9.8 x 10 ⁹	4 x 10 ¹	1.1×10^{10}

Although host-controlled modification has previously been reported to occur in \underline{S} . \underline{aureus} , \underline{s} , \underline{e} our system is unusual in the magnitude of the restriction and modification observed. For this reason, the phage 71 system should be useful for the investigation of the molecular basis of restriction and modification in \underline{S} . \underline{aureus} . We also suggest that it might be possible, through the use of host-controlled modification, to alter the host ranges of the existing typing phages so that they could be used to identify "untypable" strains of \underline{S} . \underline{aureus} .

LITERATURE CITED

- Chu, F.S.; Thadhani, K.; Shantz, E.J.; Bergdoll, M.S. 1966. Purification and characterization of staphylococcal enterotoxin A. Biochemistry 5:3281-3289.
- Blair, J.E.; Williams, R.E.O. 1961. Phage typing of staphylococci. Bull. WHO 24:771-784.
- 3. Adams, M.H. 1959. Bacteriophages. (Interscience) John Wiley & Sons, Inc., New York. 620 p.
- Arber, W. 1965. Host-controlled modification of bacteriophage. Annu. Rev. Microbiol. 19:365-378.
- 5. Ralston, D.J.; Krueger, A.P. 1954. The isolation of a staphylococcal phage variant susceptible to an unusual host control. J. Gen. Physiol. 37:685-716.
- Wentworth, B.B.; Romig, W.R. 1968. Recombinants of a defective lysogen of staphylococcal strains. Jap. J. Microbiol. 12:299-307.

Unclassified

DOCUMENT CONTROL DATA - R & D
Department of the Army Fort Detrick, Frederick, Maryland, 21701 ALTERED HOST PANGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PHAGE 71 A OBSERVATIVE HOTES (Type of report and inchasive dates) 1 AUTHORIS (First mann, middle initial, last mann) 1 Van D. Goldberg Theodore Bryan - REPORT DATE October 1969 A PROJECT NO. 18061102871A - DOSSERVATION STATEMENT Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. 11. Supplementary Hotel (Any other numbers field may be designed discovered) Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 ⁻⁹ on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified on 71.
Department of the Army Fort Detrick, Frederick, Maryland, 21701 **REPORT VIVIE ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PRACE 71 **CORRESPONDED TYPE OF PRODUCT and Inchesive dutes) **A AUTHORISM (First mass, middle initial, last mass) Ivan D. Goldberg Theodore Bryan **REPORT DATE OCCOMPT 1969 **A CONTRACT ON STANT NO. **A PROJECT NO. 18061102871A **A. PROJECT NO. 18061102871A **A. PROJECT NO. 18061102871A **A. CONTRACT ON STANTAND OF PAGES **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **OUT THE CONTRACT ON STANTAND OF PAGES **A. NO. OF REPS **OUT THE CONTRACT ON STANTAND OF PAGES **OUT THE CONTRACT ON STANTA
Port Detrick, Frederick, Maryland, 21701 **REPORT VIVE ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PRAGE 71 **CORRESPONDED FOR THE PRAGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PRAGE 71 **CORRESPONDED FOR THE PRAGE
Fort Detrick, Frederick, Maryland, 21701 *** REPORT VILLE **ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION OF STAFHYLOCOCCUS AUREUS TYPING FRAGE 71 ***DESCRIPTIVE MOTES (Type of report and inclusive dates) ***LUANDORS) (First mann, middle ballini, last name) IVAN D. Goldberg Theodore Bryan ***EMPORT DATE October 1969 ***A. CONTRACT OR GRANT NO. ***A. PROJECT NO. 1B061102B71A ***DISTRIBUTION STATEMENT Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. **Release or announcement to the public is not authorized. **II. BUPPLEMENTARY NOTES ***DISTRIBUTION STATEMENT Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on 8. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 10 on 71.
ALTERED HOST RANGE BY HOST-CONTROLLED MODIFICATION OF STAPHYLOCOCCUS AUREUS TYPING PRAGE 71 4. CESSERIE VIVE MOTES (Type of report and inclusive dutes) 5. AUTHORIES (First mann. middle initial, last name) IVAN D. Goldberg Theodore Bryan 6. REPORT DATE OCTOBER 1969 72. TOTAL NO. OF PAGES 73. NO. OF REPS 6 84. ON TRACT ON GRANT NO. 85. ORIGINATOR'S REPORT NUMBERS 16. ORIGINATOR'S REPORT NUMBERS 17. NO. OF REPS 6 86. ORIGINATOR'S REPORT NUMBERS 18. ORIGINATOR'S REPORT NUMBERS 18. ORIGINATOR'S REPORT NUMBERS 19. NO. OF REPS 6 6 10. ORIGINATOR'S REPORT NUMBERS 19. NO. OF REPS 6 10. ORIGINATOR'S REPORT NUMBERS 19. NO. OF REPS
TYPING PRACE 71 A DESCRIPTIVE HOTES (Type of report and inclusive dutes) 5. AUTHORSS) (First seems, middle initial, last seems) Ivan D. Goldberg Theodore Bryan 6. REPORT DATE OCTOBER 1969 5. OCTOBER 1969 6. OCTOBER 1969 6. OCTOBER 1960 6. OCTOBER 1960 6. OCTOBER 1960 6. OCTOBER 1960 6. OCTOBER REPORT NUMBERS 6. OCTOBERS 72. NO. OF REPS 6. OCTOBERS 73. NO. OF REPS 6. OCTOBERS 74. NO. OF REPS 6. OCTOBERS 75. NO. OF REPS 6. OCTOBERS 76. NO. OF REPS 6. OCTOBERS 76. NO. OF REPS 6. OCTOBERS 77. NO. OF REPS 6. OCTOBERS 78. NO. OF REPS 6. OCTOBERS 78. NO. OF REPS 6. OCTOBERS 78. NO. OF REPS 6. OCTOBERS 79. NO. OF REPS 6. OCTOBERS 72. NO. OF REPS 6. OCTOBERS 72. NO. OF REPS 6. OCTOBERS 72. NO. OF REPS 72. NO. OF REPS 72. NO. OF REPS 73. NO. OF REPS 74. NO. OF REPS 75. NO. OF REPS 75. NO. OF REPS 76. NO. OCTOBERS 76. NO. OCTOBERS 77. NO. OCTOBERS 78. NO. OCTOBERS 79. NO. OCTOBERS 79. NO. OCTOBERS 79. NO. OCTOBERS 79. NO
TYPING PRACE 71 A DESCRIPTIVE HOTES (Type of report and inclusive dutes) 5. AUTHORSS) (First seems, middle initial, last seems) Ivan D. Goldberg Theodore Bryan 6. REPORT DATE OCTOBER 1969 5. OCTOBER 1969 6. OCTOBER 1969 6. OCTOBER 1960 6. OCTOBER 1960 6. OCTOBER 1960 6. OCTOBER 1960 6. OCTOBER REPORT NUMBERS 6. OCTOBERS 72. NO. OF REPS 6. OCTOBERS 73. NO. OF REPS 6. OCTOBERS 74. NO. OF REPS 6. OCTOBERS 75. NO. OF REPS 6. OCTOBERS 76. NO. OF REPS 6. OCTOBERS 76. NO. OF REPS 6. OCTOBERS 77. NO. OF REPS 6. OCTOBERS 78. NO. OF REPS 6. OCTOBERS 78. NO. OF REPS 6. OCTOBERS 78. NO. OF REPS 6. OCTOBERS 79. NO. OF REPS 6. OCTOBERS 72. NO. OF REPS 6. OCTOBERS 72. NO. OF REPS 6. OCTOBERS 72. NO. OF REPS 72. NO. OF REPS 72. NO. OF REPS 73. NO. OF REPS 74. NO. OF REPS 75. NO. OF REPS 75. NO. OF REPS 76. NO. OCTOBERS 76. NO. OCTOBERS 77. NO. OCTOBERS 78. NO. OCTOBERS 79. NO. OCTOBERS 79. NO. OCTOBERS 79. NO. OCTOBERS 79. NO
TVAN D. Goldberg Theodore Bryan PREPORT DATE October 1969 A PROJECT NO. 18061102871A Technical Manuscript 548 CHE 6568 POSTRIBUTION STATEMENT Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. Release or announcement to the public is not authorized. The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick, Frederick, Maryland, 21701 The Supplementance of the Army Fort Detrick of the Army Fort De
Ivan D. Goldberg Theodore Bryan FREPORT DATE October 1969 CONTRACT OR GRANT NO. PROJECT NO. 18061102B71A Technical Manuscript 548 CMs 6568 CMs 6568 Technical manuscript be seeigned CMs 6568 To onsymboly in staylenest and dissemination of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. The supplementary notes The public is not authorized. The supplementary notes The supplementary notes are not such or suc
Ivan D. Goldberg Theodore Bryan FREPORT DATE October 1969 CONTRACT OR GRANT NO. PROJECT NO. 18061102B71A Technical Manuscript 548 CMs 6568 CMs 6568 Technical manuscript be seeigned CMs 6568 To onsymboly in staylenest and dissemination of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. The supplementary notes The public is not authorized. The supplementary notes The supplementary notes are not such or suc
Theodore Bryan Theodore Bryan Theodore 1969 The contract of grant no. T
October 1969 CONTRACT ON GRANT NO. A PROJECT NO. 18061102871A Technical Manuscript 548 CMs 6568 18. OSTRIBUTION STATEMENT Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. 11. SUPPLEMENTARY NOTES Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 10 on 71.
October 1969 Section of the publication from DDC. Foreign announcement to the public is not authorized. Release or announcement to
Technical Manuscript 548 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** Prof. CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** OTHER REPORT HOUSE (Any other marker that may be designed that publication from DDC. ** Poreign announcement and dissemination of this publication by DDC is not authorized. ** Prof. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 ** Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
Technical Manuscript 548 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** Prof. CMs 6568 ** OTHER REPORT HOUSE (Any other marker that may be designed this report) ** OTHER REPORT HOUSE (Any other marker that may be designed that publication from DDC. ** Poreign announcement and dissemination of this publication by DDC is not authorized. ** Prof. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 ** Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
CMs 6568 10. ONE 6568 10. ONE 6568 10. ONE 6568 11. SUPPLEMENTARY HOTES 12. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 12. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 13. ALBSTRACT Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 10 on 71.
CMs 6568 10. DISTRIBUTION STATEMENT Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. 11. SUPPLEMENTARY HOYES 12. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 Thage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. 11. SUPPLEMENTARY NOTES 12. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 15. Astronomical Control of the Army Fort Detrick, Frederick, Maryland, 21701 16. x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10-10 on 71.
Qualified requesters may obtain copies of this publication from DDC. Foreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. 11. SUPPLEMENTARY NOTES 12. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 15. Astronomical Control of the Army Fort Detrick, Frederick, Maryland, 21701 16. x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10-10 on 71.
Poreign announcement and dissemination of this publication by DDC is not authorized. Release or announcement to the public is not authorized. II. SUPPLEMENTARY NOTES Department of the Army Fort Detrick, Frederick, Maryland, 21701 Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
Release or announcement to the public is not authorized. 11. SUPPLEMENTARY HOTES 12. SPONSORING MILITARY ACTIVITY Department of the Army Fort Detrick, Frederick, Maryland, 21701 18. ASSTRACT Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on 5. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
Department of the Army Fort Detrick, Frederick, Maryland, 21701 Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on 5. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10-10 on 71.
Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10-10 on 71.
Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10 on 71.
Phage 71 propagated on Staphylococcus aureus 71 has a calculated efficiency of 6 x 10 on 5. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10-10 on 71.
6 x 10 on S. aureus 100, isolate 6N-15. After propagation on 6N-15, a modified phage is produced that plaques with an efficiency of 1.0 on 6N-15 and 5 x 10-10 on 71.
14. Key Words
S. aureus
Lysis
Bacteriophage
Host-controlled modification
Restriction

Unclassified